a climbing plant, '... may, by a careful use of the knife at the right season, be kept in the form of a garden shrub; and it is even used for hedges' (pp. 120–121).

The book is beautifully illustrated throughout with some of the works of these talented ladies. Examples include: detail of the Native Clematis and Coral Pea by Louisa Anne Meredith; a grouping of *Correa speciosa*, *Hibertia*, *Styphelia virgata* etc. by Euphemia Henderson (a would be bride of Mueller); a detailed composite of orchids by Fanny Anne Charsley; a beautiful rendition of one of the Blood Wood Eucalypts by Anna Frances Walker, *Bignonia jasminoides* by Harriet Scott; *Antheraea simplex* on *Eleocarpus obovatus* by Helena Scott; a composite of Passifloras by Louisa Atkinson; *Hardenbergia ovata* by Fanny De Mole; flowers of the Flame-Tree and Yellow and Black Twiner by Marianne North; *Jasminum calcareum* by Margaret Forrest (who gave Marianne North a 'kangaroos foot' of 'black velvet with yellow satin lining' to paint); the beautiful Stinkhorns by Ellis Rowan; Eremophilas by Rosa Fiveash; *Lobelia gracilis* and *Abutilon halophilum* by Gertrude Lovegrove; *Agaricus pulchellus* by Flora Martin and *Pannus carbonarius* by Maria Magdalena Wehl.

This fascinating book is a fount of information, beautifully written and interspersed with intriguing quotes and photographs. The paintings of some of these 'collecting ladies' have made their way to Calendars for 2015, perhaps anticipating the Christmas season. If you need a gift for someone interested in history, in plants, in art or in literature, this book would be ideal. And if you are looking for a gift for someone who has not expressed an interest in such areas, this book could make them a convert.

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Living Waters: Ecology of animals in swamps, rivers, lakes and dams

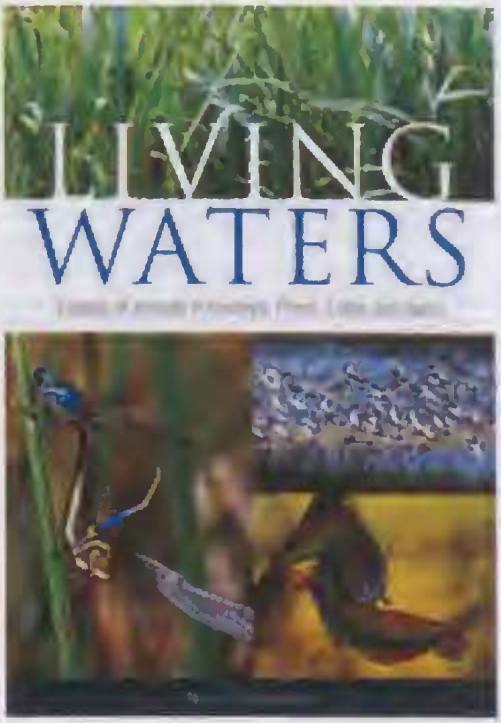
by Nick Romanowski

Publisher: *CSIRO Publishing, Collingwood, Vic. 2013. x + 292 pages, paperback, coloured photographs. ISBN 9780643107564. RRP $39.95*

Fifty years of wetlands study has well qualified the author of this book to educate readers about how ecological patterns, processes and animal interactions merge into a seamless whole. He defines ecology, in a broad sense, to be the study of food, finding it and avoiding becoming it. What all organisms seek is food; shelter (protection from predators and climate); and a place to breed. The geographic scope of the book is the inland waters from Tasmania to the tropics, and its intention is to describe the underlying forces that drive ecological change and movement in Australian wetlands.

Although Romanowski is best known as a writer on wetland plants, his primary background and qualifications are in zoology and he trained at Monash University when Ian Bayly and Bill Williams were revolutionising the study of the ecology of Australian inland waters. The writing is taut and easy to read and it is pleasing to see that nomenclature is up-to-date: things like recognising that the Silver Gull now resides in the genus *Chroicocephalus* and the fact that the freshwater species of the Anostraca are known as Fairy Shrimps while their saline counterparts are Brine Shrimps. Perhaps one criticism: phrases such as 'Many species haven't bothered evolving ways of protecting their flying wings.' are unnecessarily facetious and add nothing to the imperative of enhancing scientific literacy amongst those who need it.

The book is divided into three sections, all copiously illustrated with the author's excellent photographs. The first six chapters are a roll-call of common or unusual species: crustaceans; insects; other invertebrates; fishes; frogs, reptiles



and mammals; and birds. No scientific names are given in the text but they are grouped in a separate appendix, which contains 364 different taxa, although some are duplicates and some are missing. The reader can see the breadth of coverage of this book, and a hint of the author's interests, when you see that number comprises: Birds (66), Crustaceans (42), Fish (103), Frogs (20), Fungi (1), Insects (24), Other invertebrates (9), Molluscs (3); Plants (62), Reptiles (26), Spiders (5) and Vertebrates (3). Each of these faunal chapters discusses the body-plan of the organism and how its particular features are suited to the aquatic life and the niches where it will be found. Then follows the life history of members of the major groups. The emphasis is on how they breathe, move, eat and grow, and their interactions with other animals. There are lots of statements giving rare or poorly-known information such as the larvae of freshwater mussels being parasitic on the gills of fishes. Information boxes discuss such things as metamorphosis, parasites and human impacts.

Section 2 is entitled *Living with Change* and the first three chapters describe how seasonal changes shape the ecology of many types of wetland. The first deals with ephemeral wetlands and, for each major group of animals, Romanowski explains how they colonise a new wetland and then survive its demise by moving on or by adopting some drought-tolerant mechanism such as encysting, aestivation or deep burial. The succession of species starts with the decay of any organic matter that has built up during the dry phase, breaking down to provide food for a bacterial bloom, and can finish with opportunistic species of birds which have the mobility to exploit ephemeral resources. The next chapter expands the moving-on and colonising options, discussing at length dispersal of fish and how the apparently suicidal urge to move upstream into regions that will dry out, although counter-intuitive, can be explained as a bet-hedging strategy. Some frogs and freshwater turtles can move surprising distances and the winged adults of aquatic insects are excellent colonisers of new waters. Waterbirds are the greatest travellers as they follow the rains, but differing flight styles and their implications are discussed as is the need to moult flight feathers where different modes have evolved to suit different lifestyles. Chapter 9, being a chronology of life forms as Lake Colac in western Victoria moves from a dry bed to deep water, is somewhat of a case-study of the previous chapters. For 30 years the author documented in words and pictures the drying out of the lake and its refilling after drought-breaking rains in 2009, with special emphasis on the fish and the birds. Of course, their invertebrate food sources also have a succession story to be told. The final chapter in this section concludes that predators also influence the ecology by regulating population size and shaping evolutionary history. Specific instances of the latter are the prolific breeding of copepods and water fleas as insurance for the few, armour against attack epitomised in the larger Crustacea, and the use of specialised refuges. The other theme in the chapter is how predators locate and capture their prey whilst avoiding the same fate from something higher up the trophic chain. Insect mouthparts get a special

mention, with the larvae of dragonflies and carnivorous water beetles being the exemplars. Almost every chapter in Section 2 has a box discussing human impacts.

In Section 3 there are eight chapters which, in essence, follow the path of water downhill from rainfall to mountain soaks, through streams, fast rivers, slow rivers, lakes and lagoons to estuaries, saltmarshes and mangroves, and then man-made dams. Another dimension to the journey is the changes that occur as salinity rises. There are two stories here: the first is the fluvial aspects of geomorphology while the other considers changes in temperature and dissolved gases and minerals, particularly salts. The energy level of a river depends on its speed and the amount of water it carries. In turn, these are determined by the gradient, roughness of the channel, size of the drainage basin, presence of vegetation and climate. In general, as the altitude decreases so does the energy of the waterway, which means the size of the particles it can carry also falls. High-energy streams have a bed of cobbles, anything smaller having been swept away. In the middle reaches the sands drop out and, in the quietest of backwaters, given time, the silts will settle. Even in the most turbulent streams there is a laminar layer close to the bed which can provide a refuge for invertebrates. On this same journey the oxygen levels will tend to fall but the nutrient levels will rise, so productivity increases down the spectrum. In a country the size of Australia, with its diverse geography and climate, there will be an inordinate number of different aquatic niches, each supporting animals that have evolved in those conditions. The reader will meet lots of examples in the third section of this book.

Who should read this book? Obviously, anyone who is fascinated by the aquatic fauna, the way its members live their lives, and the reasons why they are successful. Also those who are generally interested in where evolution and ecology meet. Not to mention those who want to know more about Australia's rivers, streams and other types of wetland.

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Australian Natural History Medallion Trust Fund

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If you would like to contribute to this fund, which supports the Australian Natural History Medallion, donations should be sent to: The Treasurer, Field Naturalists Club of Victoria, P O Box 13, Blackburn, Victoria 3130. Cheques should be made payable to the 'Australian Natural History Medallion Trust Fund'.

The medallion is awarded annually to a person who is considered to have made the most significant contribution to the understanding of Australian natural history in the last ten years.

Gary Presland
Secretary, ANHM Committee